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into glycogen in the process of alcoholic fermentation. In other fungi also KOHL finds that glycogen is not primarily a storage product; it does not appear in the spores of the Mucorales nor in sclerotia until germination or growth has begun. In the same paper KOHL gives some preliminary observations on the sporulation in yeast. The young spores are frequently surrounded by fatty substances in the early stages of formation. The nucleus divides amitotically both in budding and in spore formation, and one to four spores are formed. In the first case the cell nucleus becomes the spore nucleus directly. Often a nucleus which does not produce a spore remains in the cytoplasm of the mother cell after the spores are formed.—H. HASSELBRING.

**Supernumerary pollen grains of Fuchsia.**—BEER<sup>17</sup> has investigated Fuchsia, whose pollen mother cells are recorded as producing five to fourteen microspores. He found frequently six to ten microspores within a single cell, and a study of the nuclear divisions led to the conclusion that these high numbers are due to the occurrence of irregularities in the distribution of the chromosomes during anaphase, as described by JUEL for Hemerocallis. The chromosomes move very unevenly toward the poles, and some, either singly or in groups, lag behind and often become cut off entirely from the two main chromosome groups. Usually these separated chromosomes give rise to distinct nuclei, which vary in size according to the number of chromosomes they contain. During the second division the small as well as the large nuclei produce distinct spindles and divide. The second division is much more regular than the first, and no supernumerary nuclei were observed to originate at this stage. The small pollen grains are as definitely organized as the large ones, so far as the usual walls and their composition are concerned.—J. M. C.

**Embryo sac of Peperomia.**—JOHNSON<sup>18</sup> has discovered in a delicate, shade-loving, Jamaican species of Peperomia (*P. hispidula*) an interesting variation of the well-known situation in *P. pellucida*. There is a single hypodermal arche-sporial cell, which cuts off a tapetal cell. The mother cell develops the embryo sac directly, the first four free nuclei being "arranged in a perfect tetrad." At the next division a distinct polarity is developed, two nuclei passing to the micropylar end of the sac, and the other six grouping at the antipodal end. At the next division the Peperomia condition of sixteen free nuclei is reached, four being micropylar and twelve antipodal. A well-defined egg and one synergid are organized, the two remaining micropylar nuclei passing toward the center of the sac, where they encounter the twelve antipodal nuclei. The whole group of fourteen nuclei fuses into one great fusion nucleus. The division of this fusion nucleus is accompanied by wall-formation, and an endosperm tissue of about forty cells is developed.—J. M. C.

<sup>17</sup> BEER, RUDOLF, The supernumerary pollen grains of Fuchsia. *Annals of Botany* 21:305-307. 1907.

<sup>18</sup> JOHNSON, D. S., A new type of embryo sac in Peperomia. *Johns Hopkins Univ. Circ.* 1907:no. 3. 19-21. *pls.* 5-6.